

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 **Claim 1 (currently amended):** A method of making a
2 hollow, reinforced pressure vessel, ~~plastic composite~~
3 ~~articles~~, comprising the steps of:
4 cutting thermoplastic fibers to form a plurality of
5 discrete thermoplastic fibers;
6 forming a hollow preform comprised of a cylindrical
7 sidewall portion, a domed bottom portion, and a domed top
8 portion, wherein at least one ~~one or more~~ of said
9 portions ~~include~~ is comprised substantially of a
10 plurality of discrete reinforcing fibers separate from,
11 and intimately intermixed with, said plurality of
12 discrete thermoplastic fibers, wherein said intermixed
13 fibers substantially maintain said preform shape;
14 providing a rigid mold having a cylindrical sidewall
15 portion and domed end portions corresponding to said
16 preform portions;
17 positioning said preform against the inner surface
18 of said corresponding mold portions;
19 compressing said preform with an internally
20 pressurized, inflatable core having a cylindrical

21 sidewall portion, and top and bottom dome portions to
22 hold said preform in place;
23 heating said preform to a temperature sufficient to
24 melt said thermoplastic fibers while the pressure in said
25 inflatable core compresses said preform and distributes
26 thermoplastic material from said thermoplastic fibers
27 throughout said preform to provide a fiber reinforced
28 molded article;
29 cooling said molded article until said thermoplastic
30 material is substantially solid;
31 reducing the pressure in said inflatable core; and
32 removing said molded article from said mold.

1 **Claim 2 (previously presented):** The method of claim
2 1 wherein the pressure in said inflatable core is
3 increased during the heating step to compress said
4 preform and maintain the distribution of thermoplastic
5 material throughout said preform, whereby voids in the
6 fiber reinforced molded article may be further reduced.

1 **Claim 3 (original):** The method of claim 1 wherein
2 said hollow preform comprises a separately preformed
3 sidewall portion and integrated bottom portion and a
4 separately preformed top dome portion.

1 **Claim 4 (original):** The method of claim 1 wherein
2 said hollow perform comprises a separately preformed
3 cylindrical sidewall portion and comprises separately
4 preformed domed portions.

1 **Claim 5 (previously presented):** The method of
2 claim 4 wherein the separately preformed domed portions
3 are comprised of filament wound isotenoid portions.

1 **Claim 6 (original):** The method of claim 5 wherein
2 the sidewall portions overlap the domed portions.

1 **Claim 7 (previously presented):** The method of
2 claim 4 wherein said cylindrical sidewall portion is
3 formed from a rectangular blanket of reinforcing fibers
4 intimately intermixed with thermoplastic material, said
5 blanket being positioned against said cylindrical
6 sidewall portion of the mold with a slight overlap of
7 opposite ends of said blanket.

8 **Claim 8 (original):** The method of claim 1 wherein
9 the ratio of reinforcing fiber to thermoplastic material
10 is substantially constant throughout said preform.

1 **Claim 9 (original):** The method of claim 8 wherein
2 said ratio is approximately 3:2.

1 **Claim 10 (previously presented):** The method of
2 claim 1 wherein the ratio of reinforcing fiber to
3 thermoplastic material varies within said preform.

1 **Claim 11 (original):** The method of claim 1 wherein
2 the wall thickness of said preform is substantially
3 constant.

1 **Claim 12 (original):** The method of claim 1 wherein
2 the wall thickness of said preform varies along its
3 length.

1 **Claim 13 (original):** The method of claim 1 wherein
2 said reinforcing fibers are glass fibers.

1 **Claim 14 (original):** The method of claim 13 wherein
2 said glass fibers are approximately 1 inch in length.

1 **Claim 15 (original):** The method of claim 1 wherein
2 said thermoplastic material is chosen from the group

3 comprised of: polypropylene, polyethylene, polybutylene
4 terephthalate, polyethylene terephthalate, and nylon.

1 **Claim 16 (original):** The method of claim 1 further
2 comprising, prior to said compressing, the step of
3 treating the outer surface of said inflatable core with
4 an adhesive agent so that said core is bonded to the
5 interior of said molded article.

1 **Claim 17 (original):** The method of claim 1 further
2 comprising, prior to said compressing, the steps of:
3 treating a surface of one of the top and bottom dome
4 portions and an adjacent sidewall portion of said
5 inflatable core with an adhesive agent to provide an
6 adhesive coated portion; and

7 treating a surface of another of said top and bottom
8 dome portions and an adjacent sidewall portion with a
9 releasing agent to provide a release coated portion; and,
10 after said removing, the step of:

11 disengaging the release coated portion of said
12 inflatable core from an inner surface of said molded
13 article while the adhesive coated portion remains adhered
14 to an inner surface of said molded article.

1 **Claim 18 (original):** The method of claim 1 further
2 comprising, prior to said compressing, the step of
3 treating the outer surface of said inflatable core with a
4 releasing agent; and, after removing said molded article
5 from the mold, the step of removing said inflatable core
6 from said molded article.

1 **Claim 19 (original):** The method of claim 1 wherein
2 said temperature is approximately 400 °F and maintaining
3 said temperature for a period of at least approximately
4 30 minutes.

1 **Claim 20 (original):** The method of claim 2 wherein
2 said pressure is increased to approximately 2530 psi.

Claims 21-23 (canceled)

1 **Claim 24 (original):** The method of claim 1 wherein
2 said inflatable core is a neoprene bladder.

1 **Claim 25 (original):** The method of claim 1 further
2 comprising the step of connecting said mold to a source
3 of vacuum during the heating step to further reduce the
4 incidence of voids in the finished article.

1 **Claim 26 (original):** The method of claim 2 further
2 comprising the step of connecting said mold to a source
3 of vacuum during the heating step to further reduce the
4 incidence of voids in the finished article.

1 **Claim 27 (currently amended):** A method of making a
2 hollow, reinforced pressure vessel, ~~plastic composite~~
3 ~~articles~~, comprising the steps of:

4 forming a hollow preform comprised of a cylindrical
5 sidewall portion, a domed bottom portion, and a domed top
6 portion, said forming including the steps of:

7 providing a plurality of discrete reinforcing
8 fibers;

9 providing a plurality of discrete cut thermoplastic
10 fibers; and

11 forming at least one ~~or more~~ of said cylindrical
12 sidewall portion, domed bottom portion, and domed top
13 portion by collecting said plurality of discrete
14 reinforcing fibers and said plurality of discrete
15 thermoplastic fibers onto a vacuum screen to form said
16 one or more portions, wherein said plurality of fibers
17 substantially maintain a shape of said at least one
18 portion;

19 providing a hollow liner within said preform, said
20 liner having a cylindrical sidewall portion, a domed
21 bottom portion, and a domed top portion;
22 providing a rigid mold having a cylindrical sidewall
23 portion and domed end portions corresponding to said
24 preform portions;
25 positioning said preform against the inner surface
26 of said corresponding mold portions;
27 heating said preform sufficient to melt said
28 thermoplastic fibers and distribute thermoplastic
29 material from the thermoplastic fibers throughout said
30 preform to provide a fiber reinforced molded article;
31 cooling said molded article until said thermoplastic
32 material is substantially solid; and
33 removing said molded article from said mold.

Claim 28 (previously presented): The method of
claim 27 wherein said liner is a thermoplastic liner.

1 **Claim 29 (previously presented):** The method of
2 claim 27 further comprising, during said heating, the
3 step of pressurizing the liner with a gas or a fluid; and
4 prior to removing said molded article from the mold, the
5 step of reducing the pressure in said plastic liner.

1 **Claim 30 (original):** The method of claim 29 further
2 comprising, during said heating, the step of connecting
3 said mold to a source of vacuum during the pressurizing
4 step to further reduce the incidence of voids in the
5 finished article.

1 **Claim 31 (currently amended):** A method of making a
2 hollow, reinforced pressure vessel, ~~plastic composite~~
3 ~~articles~~, comprising the steps of:

4 a) providing:

5 i) a hollow preform of glass reinforcing
6 fibers approximately one inch long intimately intermixed
7 with separate thermoplastic fibers approximately two
8 inches long, wherein the ratio of glass fibers to resin
9 fibers is approximately 3:2 uniformly throughout said
10 preform, said preform having a cylindrical sidewall
11 portion, a domed bottom portion, and a domed top portion,
12 and

13 ii) a rigid mold having a cylindrical sidewall
14 portion and domed end portions corresponding to said
15 preform portions;

16 b) positioning said preform against the inner
17 surface of said corresponding mold portions;

18 c) compressing said preform with an internally
19 pressurized, flexible inflatable core having a
20 cylindrical sidewall portion, and top and bottom dome
21 portions to hold said preform in place;

22 d) heating said preform to approximately 400
23 degrees F while maintaining that temperature for
24 between 20 and 60 minutes, while also increasing the
25 pressure in said inflatable core to approximately 25-30
26 psi to compress said preform and maintain the
27 distribution of the thermoplastic material throughout
28 said preform to provide a substantially void free fiber
29 reinforced molded article;

30 e) cooling said molded article until said
31 thermoplastic material is substantially solid;

32 f) reducing the pressure in said inflatable core;

33 g) removing said molded article from said mold;
34 and

35 h) removing said inflatable core from the molded
36 article.

1 **Claim 32 (previously presented):** The method of
2 claim 31 further comprising the step of connecting said
3 mold to a source of vacuum during said heating to further
4 reduce the incidence of voids in the finished article.

Claims 33-34 (canceled)

1 **Claim 35 (previously presented):** A method of making
2 hollow, reinforced plastic composite articles, comprising
3 the steps of:

4 a) providing:

5 i) a hollow perform comprised of a plurality
6 of discrete reinforcing fibers intimately intermixed with
7 a thermoplastic material, said preform having a
8 cylindrical sidewall portion, a domed bottom portion, and
9 a domed top portion, and

10 ii) a rigid mold having a cylindrical sidewall
11 portion and domed end portions corresponding to said
12 preform portions;

13 b) positioning said preform against the inner
14 surface of said corresponding mold portions without a
15 prior winding step;

16 c) compressing said preform with an internally
17 pressurized, inflatable core having a cylindrical
18 sidewall portion, and top and bottom dome portions to
19 hold said preform in place;

20 d) heating said preform to a temperature
21 sufficient to melt said thermoplastic material while the

22 pressure in said inflatable core compresses said preform
23 and maintains the distribution of the thermoplastic
24 material throughout said preform to provide a fiber
25 reinforced molded article;

26 e) cooling said molded article until said
27 thermoplastic material is substantially solid;

28 f) reducing the pressure in said inflatable core;
29 and

30 g) removing said molded article from said mold.

1 **Claim 36 (currently amended):** A method of making
2 hollow, reinforced plastic composite articles, comprising
3 the steps of:

4 a) providing:

5 i) a ~~discrete~~ cylindrical sidewall portion, a
6 ~~discrete~~ domed bottom portion, and a discrete domed top
7 portion;

8 ii) a rigid mold having a cylindrical sidewall
9 portion and domed end portions corresponding to said
10 preform portions; and

11 iii) a flexible, inflatable core;

12 b) positioning said core within said preform and
13 placing said ~~discrete~~ cylindrical sidewall portion, said
14 ~~discrete~~ domed bottom portion, and said discrete domed

15 top portion against the inner surface of said
16 corresponding mold portions ~~such that said cylindrical~~
17 ~~sidewall portion overlaps each domed portion~~ to form a
18 preform having said core inserted into an interior of
19 said preform;

20 c) inflating said core for compressing and
21 pressurizing said preform to hold said preform in place;

22 d) heating and pressurizing said preform for a
23 period of time to compress said preform and maintain the
24 distribution of ~~the~~ thermoplastic material throughout
25 said preform to provide a substantially void free fiber
26 reinforced molded article;

27 e) cooling said molded article until said
28 thermoplastic material is substantially solid;

29 f) reducing the pressure in said inflatable core;

30 g) removing said molded article from said mold;

31 and

32 h) removing said inflatable core from the molded
33 article.

1 **Claim 37 (currently amended):** The method of
2 claim 36, wherein at least one ~~or more~~ of said ~~discrete~~
3 cylindrical sidewall portion, said ~~discrete~~ domed bottom
4 portion, and said discrete domed top portion are

5 comprised of a plurality of discrete reinforcing fibers
6 intimately intermixed with a plurality of discrete
7 thermoplastic fibers.

1 **Claim 38 (currently amended)** A method of making a
2 hollow, reinforced pressure vessel, ~~plastic composite~~
3 ~~articles~~, comprising the steps of:

4 cutting thermoplastic fibers to form a plurality of
5 discrete cut thermoplastic fibers;

6 forming a hollow preform comprised of a cylindrical
7 sidewall portion, a domed bottom portion, and a domed top
8 portion, said forming including the steps of:

9 providing a plurality of discrete reinforcing
10 fibers, and

11 forming at least one ~~or more~~ of said cylindrical
12 sidewall portions, domed bottom portion, and said domed
13 top portion by collecting said plurality of discrete
14 reinforcing fibers and said plurality of discrete
15 thermoplastic fibers onto a vacuum screen to form said
16 one or more portions, wherein said plurality of fibers
17 substantially maintain a shape of said portions;

18 providing a rigid mold having a cylindrical sidewall
19 portion and domed end portions corresponding to said
20 preform portions;

21 positioning said preform against the inner surface
22 of said corresponding mold portions; and
23 heating said preform sufficient to melt said
24 thermoplastic fibers and distribute thermoplastic
25 material from the thermoplastic fibers throughout said
26 preform to provide a fiber reinforced molded article.

1 **Claim 39 (previously presented):** The method of
2 claim 38, further comprising the step of providing a
3 hollow liner within said preform prior to said
4 positioning step.

1 **Claim 40 (previously presented):** The method of
2 claim 39 further comprising, during said heating, the
3 step of pressurizing the liner with a gas or a fluid.

1 **Claim 41 (previously presented):** The method of
2 claim 39 wherein said liner is a thermoplastic liner.

1 **Claim 42 (previously presented):** The method of
2 claim 38 further comprising, during said heating, the
3 step of connecting said mold to a source of vacuum during
4 the pressurizing step to further reduce the incidence of
5 voids in the finished article.

1 **Claim 43 (new):** A method of making hollow,
2 reinforced plastic composite articles, comprising the
3 steps of:
4 a) providing a preform comprising:
5 i) a cylindrical sidewall portion and a domed top
6 portion each comprising a matrix of reinforcing fibers
7 and a thermoplastic material, said matrix including a
8 plurality of randomly positioned discrete short
9 individual fibers;
10 ii) a reinforcing mat;
11 iii) a rigid mold adapted for receiving said
12 preform; and
13 iii) a flexible, inflatable core;
14 b) wrapping said map around said cylindrical
15 sidewall portion;
16 c) placing said core within said cylindrical
17 sidewall portion;
18 d) positioning said cylindrical sidewall portion,
19 said mat, said core, and said domed top portion inside
20 said mold;
21 e) pressurizing said core by connecting said
22 preform to a source of pressurized fluid;

23

- 23 e) heating said preform within said mold with said
24 core pressurized for a period of time to compress said
25 preform and distribute said thermoplastic material
26 throughout said preform to provide a substantially void
27 free fiber reinforced molded article;
28 g) reducing the pressure in said inflatable core;
29 and
30 h) removing said molded article from said mold.